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Parasites of Florida Softshell Turtles (*Apalone ferox*) from Southeastern Florida

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ABSTRACT: A total of 15 species of helminths (4 trematodes, 1 monogenean, 1 cestode, 5 nematodes, 4 acanthocephalans) and 1 pentastomid was collected from 58 Florida softshell turtles (*Apalone ferox*) from southeastern Florida. *Spiroxys amydae* (80%), *Cephalogonimus vesicaudus* (80%), *Vasotrema robustum* (76%), and *Proteocephalus* sp. (63%) were the most prevalent helminths. Significant lesions were associated with the attachment sites of *Spiroxys amydae* in the stomach wall. *Contracaecum multipapillatum* and *Polymorphus brevis* are reported for the first time in reptiles. The pentastomid *Alofia* sp. is reported for the first time in North America and in turtles.

KEY WORDS: Softshell turtle, *Apalone ferox*, helminths, pentastomes, Florida.

The Florida softshell turtle (*Apalone ferox*) ranges from southern South Carolina, through southern Georgia to Mobile Bay, Alabama, and all of Florida except the Keys (Conant and Collins, 1991). Where it is sympatric with the Gulf Coast spiny softshell turtle (*Apalone spinifera aspera*) in the Florida panhandle, the Florida softshell is found more often in lacustrine habitats. In peninsular Florida, the Florida softshell can be found in both lacustrine and riverine habitats. Little is known about the parasites of this turtle. Previously, a small number of Florida softshells was examined and 8 species of helminths were reported (Lonnberg, 1894; Stunkard 1924, 1926, 1928; Cobb, 1929; Harwood, 1932; Loftin, 1960). None of these examinations were thorough surveys. Cobb (1929) described *Spiroxys amydae* from a *Apalone ferox* (=*Amyda ferox*) from the Mississippi River, and Harwood (1932) reported *Falcaustra chelydrae* (Harwood, 1932) and *Serpinema trispinosus* (Leidy, 1852) (=*Camallanus trispinosus*) from an *Apalone ferox* from Houston, Texas. Both of these records lie well outside the range of *Apalone ferox* as currently recognized (Conant and Collins, 1991), and it is assumed that these turtles were either spiny softshells (*A. spinifera*) or smooth softshells (*A. mutica*), both of which occur in the Mississippi River and eastern Texas. In the present report, the parasites of 58 Florida softshell turtles from southeastern Florida are discussed.

Methods

A total of 58 Florida softshell turtles was examined. Fifty-seven were obtained from a commercial processor in Palm Beach County, Florida, between 1993 and 1995. Each of the 57 turtles was eviscerated during processing, and the organs and head were placed into a plastic bag and frozen until examined. The kidneys were not collected from these turtles. One turtle was collected from Collier County, Florida, in March 1995 and frozen whole until examined.

Seventeen of the turtles were examined at the Florida Game and Fresh Water Commission's Research Laboratory (GFCRL), Gainesville, Florida, and helminths were collected when seen, but parasite examinations were incomplete and not quantitative. The other 41 turtles were examined at the Department of Pathobiology, University of Florida (UF), Gainesville, where quantitative examinations for parasites followed the methods of Kinsella and Forrester (1972). Voucher specimens of helminths were deposited in the Harold W. Manter Collection (HWML), University of Nebraska State Museum, Lincoln.

Results and Discussion

A total of 15 species of helminths (4 trematodes, 1 monogenean, 1 cestode, 5 nematodes, 4 acanthocephalans) and 1 pentastomid was collected. Prevalences and intensities of parasites for the 41 quantitative examinations are listed in Table 1. Multiple infections in the 41 turtles were as follows: 5 turtles had 2 species of parasites, 2 had 3 species, 7 had 4 species, 12 had

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Table 1. Prevalences and intensities of parasites from 41 Florida softshell turtles in Florida.

	HWML no.*	Location in host†	Prevalence		Intensity	
			No. inf.	%	Mean	Range
Monogenea						
Neopolystoma orbiculare (Stunkard, 1916)	39330	?	10	24	9	1–26
Aspidogastrea						
Cotylaspis cokeri Barker and Parsons, 1914	39329	SI	10	24	9	1–44
Digenea						
Cephalogonimus vesicaudus Nickerson, 1912	39327	SI	33	80	69	1–568
Vasotrema robustum Stunkard, 1928	39326	HT, LV, LN, SP	31	76	7	1–37
Teloporia aspidonectes (MacCallum, 1917)	39328	LI	3	7	2	1–2
Cestoda						
Proteocephalus sp.	39331	SI	26	63	13	1–51
Nematoda						
Spiroxys amydae Cobb, 1929	39340	ST, SI	33	80	10	1–41
Contracaecum sp. (larvae)	—	ST	12	29	13	1–66
Falcaustra affine (Leidy, 1856)	—	LI	2	5	1	1
Serpinema sp. (larvae)	—	SI	1	2	32	—
Acanthocephala						
Neoechinorhynchus chrysemydis Cable and Hopp, 1954	39334	SI	5	12	2	1–4
Polymorphus brevis (Van Cleave, 1916)	39333	SI	3	7	1	1–2
Acanthocephalus sp.	39332	SI, LI	3	7	1	1–2
Acanthocephalan cystacanth	—	SI	1	2	1	—
Pentastoma						
Alofia sp.	—	LN, TR	33	80	6	1–40

* Accession numbers of the Harold W. Manter Collection.

† Location in host: HT = heart, LI = large intestine, LN = lungs, LV = liver, SI = small intestine, ST = stomach, TR = trachea.

5 species, 7 had 6 species, 5 had 7 species, 2 had 8 species, and 1 had 9 species.

Eroding ulcerlike lesions, up to 8 mm in diameter, were associated with the attachment sites of *Spiroxys amydae* in the stomach wall. One to 4 ulcers containing 1 to 17 *S. amydae* were seen in the infected turtles. Cobb (1929) reported similar subspherical saccate stomach lesions, associated with *S. amydae* in a softshell from the Mississippi River. *Contracaecum* larvae were seen infrequently in the ulcers, but these were located mostly in the small intestine or encysted on the outside surface of the stomach and liver. Specimens of adult male *Contracaecum multipapillatum* (Drasch, 1882) (HWML# 39339) were collected from the small intestine of 1 adult male turtle examined at the GFCRL. This is the first record of *C. multipapillatum* in reptiles; however, it is a common parasite in fish-eating birds of Florida (Huizinga, 1971; Deardorff and Overstreet, 1980; Sepúlveda et al., 1994; Kinsella et al., 1996). Moler and Berish (1995) reported that 146 (63%) of 233 softshell turtles they sampled had fish as a food item in the digestive tract. They indicated also that softshells are opportunistic feeders and probably eat fish on a regular basis, mainly through scavenging.

Lonnberg (1894) described *Tetrabothrium trionychinum*, now placed in the genus *Proteocephalus*, from *Apalone ferox* (=*Trionyx ferox*)

from Orange County, Florida, but Yamaguti (1959) considered his description too brief for adequate differentiation. Brooks (1978) thought that *T. trionychinum* might form a complex of closely related species with *Proteocephalus testudo* from *A. spinifera* and *P. australis* from a teleost fish in Texas, but recommended further material be collected from *A. ferox* in Florida. Identification to species was not possible due to the poor condition of our specimens, so this problem remains to be resolved.

Immature specimens of *Polymorphus brevis* were collected from 3 turtles. This acanthocephalan has been reported from several species of Florida birds, including the bald eagle. (*Haliaeetus leucocephalus*) (Richardson and Cole, 1997) and the great blue heron (*Ardea herodius*) and yellow-crowned night-heron (*Nyctanassa violacea*) (Kinsella, unpubl.); however, this is the first report in reptiles.

Pentastomids of the genus *Alofia* were collected from the trachea, bronchi, and bronchia. Immature adults and nymphs were encapsulated also on the outside surface of the lungs. This is the first record of pentastomes in *Apalone ferox,* and of a species of *Alofia* in North America. Until now, pentastomid species in the genus *Alofia* were thought to be exclusively parasitic in crocodiles (Riley, 1994). The description of this new species is in progress.

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